PEM-FDR

56 Gb/s FDR InfiniBand card

User Guide

E9426
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About this guide

This user guide contains the information you need when installing and configuring the server management board.

How this guide is organized

This guide contains the following parts:

- **Chapter 1: Product introduction**

  This chapter describes the PEM-FDR Ethernet card features and the new technologies it supports.

- **Chapter 2: Firmware update**

  This chapter provides information in updating the firmware of PEM-FDR card.

- **Chapter 3: Driver installation**

  This chapter provides instructions in installing the PEM-FDR card's drivers on different operating systems.

Where to find more information

Refer to the following sources for additional information and for product and software updates.

1. **ASUS websites**

   The ASUS website provides updated information on ASUS hardware and software products. Refer to the ASUS contact information.

2. **Optional documentation**

   Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.

Conventions used in this guide

To make sure that you perform certain tasks properly, take note of the following symbols used throughout this manual.

DANGER/WARNING: Information to prevent injury to yourself when trying to complete a task.

CAUTION: Information to prevent damage to the components when trying to complete a task.

IMPORTANT: Instructions that you MUST follow to complete a task.

NOTE: Tips and additional information to help you complete a task.

Typography

Bold text	Indicates a menu or an item to select.
Italics	Used to emphasize a word or a phrase.
<Key>	Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key. Example: <Enter> means that you must press the Enter or Return key.
<Key1>+<Key2>+<Key3>	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: <Ctrl>+<Alt>+<Del>
`Command`	Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets. Example: At the DOS prompt, type the command line: `format a:`

PEM-FDR card specifications summary

	PEM-FDR
Controller	Mellanox ConnectX-3 FDR
Interface	PCI-E Gen3 x8
Port	QSFP
Data transfer rate	Up to 56 Gb/s FDR InfiniBand
Form factor	4.72 in. x 1.77 in. (lower than standard low profile)

*** Specifications are subject to change without notice.**

**** Supports ASUS Z10, Z9, and P9 series motherboard/system.**

Product introduction

1

This chapter provides information about the PEM-FDR card features and the new technologies it supports.

1.1 Welcome!

Thank you and congratulations for buying an ASUS® PEM-FDR card!

Before installing the 56 Gb/s FDR InfiniBand card, check the items in your package with the list below.

1.2 Package contents

Check your package for the following items.

	Standard Gift Box Pack	Standard Bulk Pack
Support DVD	1	1 (per carton)
Full height bracket with screws	1	1
Low profile bracket with screws	1	1
Packaging Quantity	1 pc per carton	5 pcs per carton

If any of the above items is damaged or missing, contact your retailer.

The default small bracket for node is a proprietray bracket that supports ASUS Z10PH-D16 series, ES4000 G3 series, and RS720Q-E8 series models*. The complete and updated list of supported models are subject to change without prior notice.

1.3 System requirements

Check if your system meets the following requirements:

- ASUS motherboard/system* with a PCI Express x8 or x16 card slot
- Supported operating system:

  Windows® and Linux operating systems (refer to the ASUS website for the latest updates).

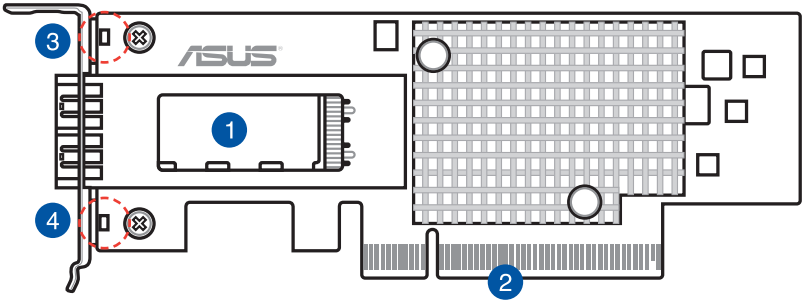
* Go to www.asus.com for the complete and updated list of supported motherboard/system models.

- Other requirements:

  Appropriate thermal solution

Ensure to update your BIOS to the latest version before using PEM-FDR on ASUS Z9 or P9 series platform server motherboard or system.

1.4 Card layout



1. QSFP connector
2. PCI Express Gen3 x8 interface
3. MLED1
4. MLED2

LED indications

MLED2	MLED1	Description
Activity/Link LED	Link	
OFF	OFF	No device
Orange	Green	Device plugged in; Ready
Orange Blinking	Green	Device plugged in; Data transmitting

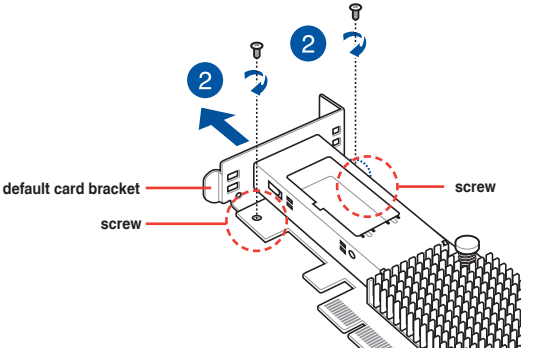
1.5 Replacing the card bracket

The ASUS PEM-FDR card is bundled with a full-heigth bracket, a low-profile bracket, and an ASUS proprietary bracket. By default, the card is pre-installed with an ASUS proprietary bracket.

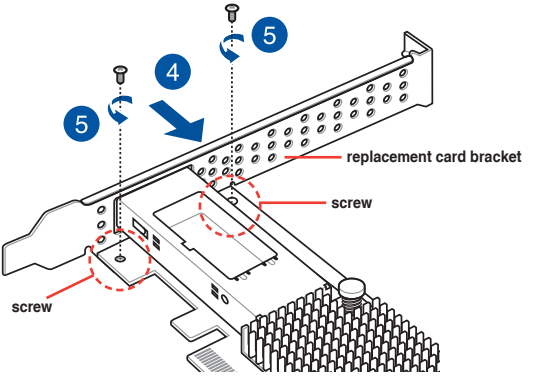
The proprietray bracket is a small bracket for node that supports ASUS Z10PH-D16 series, ES4000 G3 series, and RS720Q-E8 series models. The supported list of models are subject to change without prior notice.

To replace the card bracket:

1. Get the PEM-FDR card and place it on a stable and flat surface. Ensure that the printed circuit board (PCB) is facing down.
2. Remove the two screws that secures the PEM-FDR card to the card bracket then remove the card bracket.



3. Get the replacement card bracket.
4. Align and insert the PEM-FDR card into the mounting hole of the card bracket. Ensure that the screw holes on the PEM-FDR card matches the screw holes of the card bracket.
5. Replace the screws that you removed earlier in step 2.



Firmware update

2

This chapter provides information in updating the firmware of PEM-FDR card.

2.1 Updating the firmware

You can download the latest firmware of PEM-FDR at www.asus.com.

To update the firmware:

1. Unzip or extract the firmware file then copy it into a bootable USB device.
2. Go to the DOS prompt and key in the following command:

   mst start

```
C:\IB\FDR>mst start
c:/ib/fdr/mst.exe: List available mst devices.
Usage: c:/ib/fdr/mst.exe status
```

3. Key in the following command:

   mst status

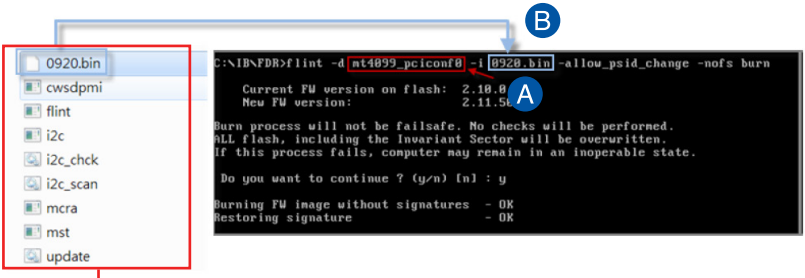
```
C:\IB\FDR>mst status
Found 3 devices:
  mt4099_pciconf0
  mt4099_pci_cr0
  mt4099_pci_uar0
```

Take note of the name of the device.

4. Key in the following command:

   flint -d [device name] -i [file name].bin -allow_psid_change -nofs burn

Ensure to key in the correct device name (A) and file name (B) of the firmware.


B
A
0920.bin
cwsdpmi
flint
i2c
i2c_chck
i2c_scan
mcra
mst
update
C:\IB\FDR>flint -d mt4099_pciconf0 -i 0920.bin -allow_psid_change -nofs burn
Current FW version on flash: 2.10.0
New FW version: 2.11.5
Burn process will not be failsafe. No checks will be performed.
ALL flash, including the Invariant Sector will be overwritten.
If this process fails, computer may remain in an inoperable state.
Do you want to continue ? (y/n) [n] : y
Burning FW image without signatures - OK
Restoring signature - OK

files on the USB device

5. When the firmware is successfully updated, reboot the system.

Driver installation

3

This chapter provides instructions in installing the PEM-FDR card's drivers on different operating systems.

3.1 Mellanox ConnectX-3 Infiniband driver installation

This section provides instructions on how install the Mellanox driver.

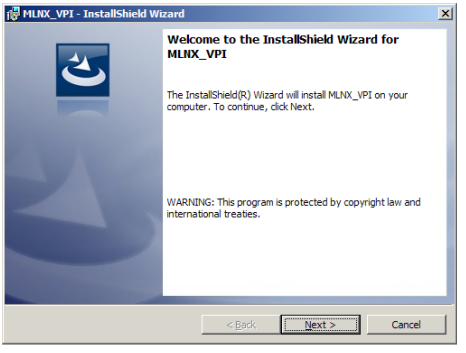
3.1.1 Windows® operating system

To install the Mellanox driver:

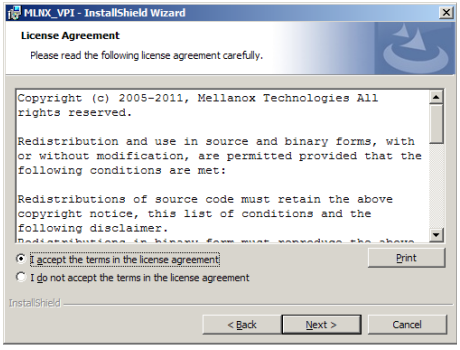
1. Restart the computer, then log on with Administrator privileges.
2. Insert the Mellanox Infiniband support DVD into the optical drive.

   The support DVD automatically displays the Drivers menu if Autorun is enabled in your computer.
3. Click **Mellanox ConnectX Virtual Channel Adapter Driver**.

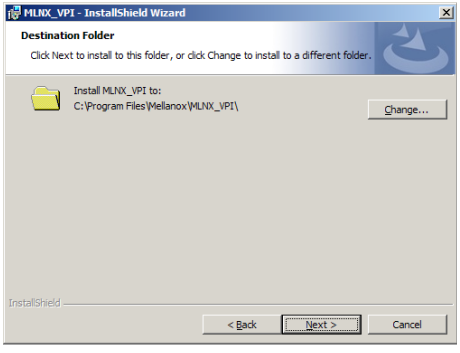
4. Click **Next** to start installing the driver.


MLNX_VPI - InstallShield Wizard
Welcome to the InstallShield Wizard for MLNX_VPI
The InstallShield(R) Wizard will install MLNX_VPI on your computer. To continue, click Next.
WARNING: This program is protected by copyright law and international treaties.
< Back
Next >
Cancel

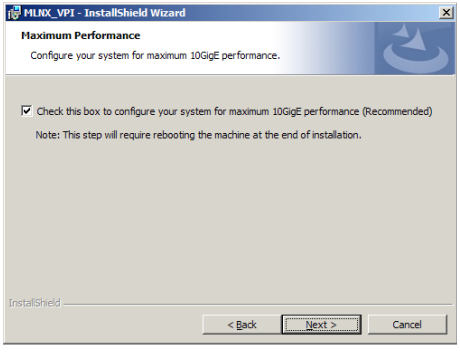
5. Tick **I accept the terms in the license agreement** then click **Next** to continue.


MLNX_VPI - InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
Copyright (c) 2005-2011, Mellanox Technologies All rights reserved.
Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:
Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
I accept the terms in the license agreement
I do not accept the terms in the license agreement
Print
InstallShield
< Back
Next >
Cancel

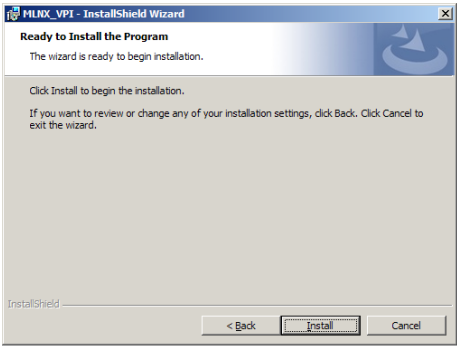
6. Click **Change** to select your desired destination folder then click **Next** to continue.



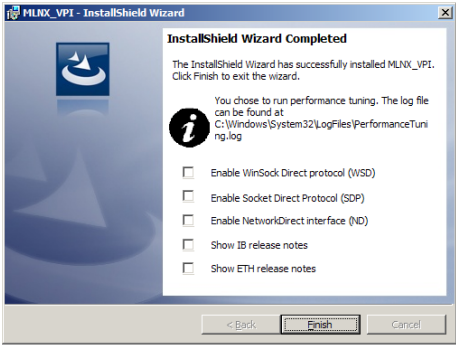
7. Tick the check box and click **Next** to continue.


MLNX_VPI - InstallShield Wizard
Maximum Performance
Configure your system for maximum 10GigE performance.
Check this box to configure your system for maximum 10GigE performance (Recommended)
Note: This step will require rebooting the machine at the end of installation.
InstallShield
< Back
Next >
Cancel

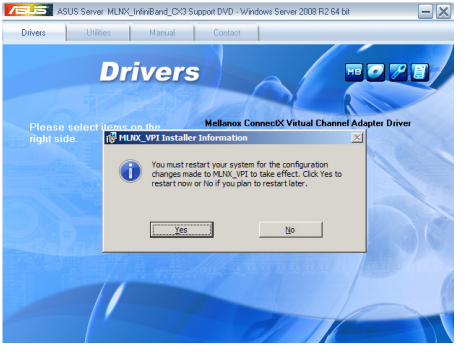
8. Click **Install** to begin the installation.


MLNX_VPI - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

9. Tick the check box on your preferred options then click **Finish** to exit the wizard.


MLNX_VPI - InstallShield Wizard
InstallShield Wizard Completed
The InstallShield Wizard has successfully installed MLNX_VPI. Click Finish to exit the wizard.
You chose to run performance tuning. The log file can be found at C:\Windows\System32\LogFiles\PerformanceTuning.log
Enable WinSock Direct protocol (WSD)
Enable Socket Direct Protocol (SDP)
Enable NetworkDirect interface (ND)
Show IB release notes
Show ETH release notes
< Back
Finish
Cancel

10. Click **Yes** to restart your system for the configuration changes to take effect.


ASUS Server MLNX_InfiniBand_CX3 Support DVD - Windows Server 2008 R2 64 bit
Drivers
Utilities
Manual
Contact
Drivers
Please select items on the right side.
Mellanox ConnectX Virtual Channel Adapter Driver
MLNX_VPI Installer Information
You must restart your system for the configuration changes made to MLNX_VPI to take effect. Click Yes to restart now or No if you plan to restart later.
Yes
No

3.1.2 Red Hat® Enterprise Linux OS

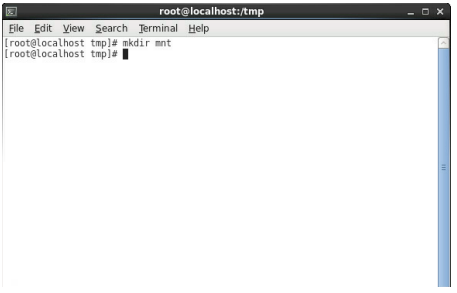
For users using SUSE Linux Enterprise Server OS, follow the general instructions in this section to mount the Mellanox driver on your system.

To mount the Mellanox driver:

1. Log in to the system as root.
2. Create a folder on the desktop and copy the latest Mellanox driver into the same folder. Rename the folder according to your preference, then key in the following commands:

   cd /

   mkdir [folder name]



3. Key in the command:

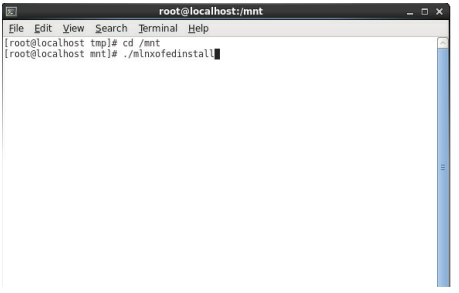
   mount -o ro,loop /tmp/[image file name] /[folder name] then mount the driver into the system.

The driver version and the OS label may vary. Ensure that the command line matches your driver version and operating system.

4. Key in the following commands:

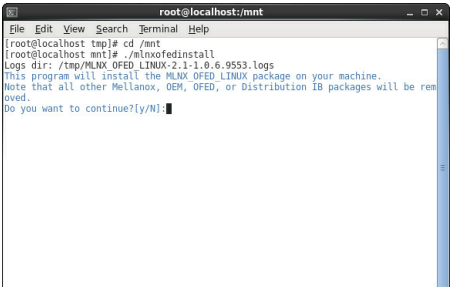
cd /[folder name]

./mlnxofedinstall

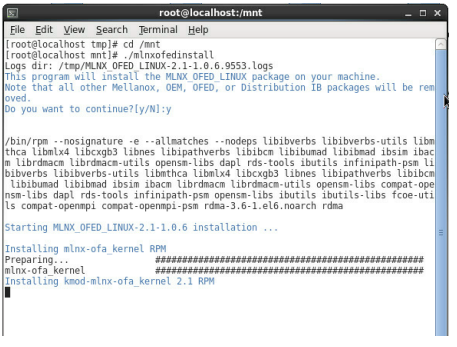


All other Mellanox, OEM, OFED, or distribution IB packages will be removed.

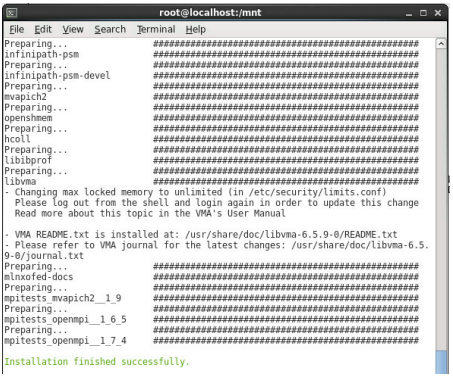
5. Press <Y> to continue.


root@localhost:/mnt
File Edit View Search Terminal Help
[root@localhost tmp]# cd /mnt
[root@localhost mnt]# ./mlnxofedinstall
Logs dir: /tmp/MLNX_OFED_LINUX-2.1-1.0.6.9553.logs
This program will install the MLNX_OFED_LINUX package on your machine.
Note that all other Mellanox, OEM, OFED, or Distribution IB packages will be rem
oved.
Do you want to continue?[y/N]:

6. Wait while the system installs the driver.


root@localhost:/mnt
File Edit View Search Terminal Help
[root@localhost tmp]# cd /mnt
[root@localhost mnt]# ./mlnxofedinstall
Logs dir: /tmp/MLNX_OFED_LINUX-2.1-1.0.6.9553.logs
This program will install the MLNX_OFED_LINUX package on your machine.
Note that all other Mellanox, OEM, OFED, or Distribution IB packages will be rem
oved.
Do you want to continue?[y/N]:y
/bin/rpm --nosignature -e --allmatches --nodeps libibverbs libibverbs-utils libm
thca libmlx4 libcxgb3 libnes libipathverbs libibcm libibumad libibmad ibsim ibac
m librdmacm librdmacm-utils opensm-libs dapl rds-tools ibutils infinipath-psm li
bibverbs libibverbs-utils libmthca libmlx4 libcxgb3 libnes libipathverbs libibcm
libibumad libibmad ibsim ibacm librdmacm librdmacm-utils opensm-libs compat-ope
nsm-libs dapl rds-tools infinipath-psm opensm-libs ibutils ibutils-libs fcoe-uti
ls compat-openmpi compat-openmpi-psm rdma-3.6-1.el6.noarch rdma
Starting MLNX_OFED_LINUX-2.1-1.0.6 installation ...
Installing mlnx-ofa_kernel RPM
Preparing...
mlnx-ofa_kernel
Installing kmod-mlnx-ofa_kernel 2.1 RPM

7. When done, reboot your system.



ASUS contact information

ASUSTeK COMPUTER INC.

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Fax	+886-2-2890-7798
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Web site	http://www.asus.com

Technical Support

Telephone	+86-21-38429911
Fax	+86-21-58668722 ext: 9101
Online Support	http://support.asus.com/techserv/techserv.aspx

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Web site	http://www.asus.com.tw

Technical Support

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Telephone	+86-21-5442-1616
Fax	+86-21-5442-0099
Web site	http://www.asus.com.cn

Technical Support

Telephone	400-620-6655
Online Support	http://support.asus.com/techserv/techserv.aspx

DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2. 1077(a)

Responsible Party Name: **Asus Computer International**

Address: **800 Corporate Way, Fremont, CA 94539.**

Phone/Fax No: **(510)739-3777/(510)608-4555**

hereby declares that the product

Product Name : InfiniBand Card

Model Number : PEM-FDR

Conforms to the following specifications:

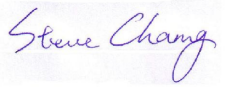
☒ FCC Part 15, Subpart B, Unintentional Radiators

Supplementary Information:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Representative Person's Name : **Steve Chang / President**

Signature :



Date : **Jun. 20, 2014**

Ver. 140331

EC Declaration of Conformity

ASUS IN SEARCH OF INCREDIBLE

We, the undersigned,

Manufacturer:	ASUSTeK COMPUTER INC.
Address:	4F, No. 150, LI-TE Rd., PEITOU, TAIPEI 112, TAIWAN
Authorized representative in Europe:	ASUS COMPUTER GmbH
Address, City:	HARKORT STR. 21-23, 40880 RATINGEN
Country:	GERMANY

declare the following apparatus:

Product name :	**InfiniBand Card**
Model name :	**PEM-FDR**

conform with the essential requirements of the following directives:

☒**2004/108/EC-EMC Directive**

☒ EN 55022:2010+AC:2011	☒ EN 55024:2010
☒ EN 61000-3-2:2006+A2:2009	☒ EN 61000-3-3:2013
☐ EN 55013:2001+A1:2003+A2:2006	☐ EN 55020:2007+A11:2011

☐**1999/5/EC-R&TTE Directive**

☐ EN 300 328 V1.7.1(2006-10)	☐ EN 301 489-1 V1.9.2(2011-09)
☐ EN 300 440-1 V1.6.1(2010-08)	☐ EN 301 489-3 V1.4.1(2002-08)
☐ EN 300 440-2 V1.4.1(2010-08)	☐ EN 301 489-4 V1.4.1(2009-05)
☐ EN 301 511 V9.0.2(2003-03)	☐ EN 301 489-7 V1.3.1(2005-11)
☐ EN 301 908-1 V5.2.1(2011-05)	☐ EN 301 489-9 V1.4.1(2007-11)
☐ EN 301 908-2 V5.2.1(2011-07)	☐ EN 301 489-17 V2.2.1(2012-09)
☐ EN 301 893 V1.6.1(2011-11)	☐ EN 301 489-24 V1.5.1(2010-09)
☐ EN 302 544-2 V1.1.1(2009-01)	☐ EN 302 326-2 V1.2.2(2007-06)
☐ EN 302 623 V1.1.1(2009-01)	☐ EN 302 326-3 V1.3.1(2007-09)
☐ EN 50360:2001	☐ EN 301 357-2 V1.4.1(2008-11)
☐ EN 62479:2010	☐ EN 302 291-1 V1.1.1(2005-07)
☐ EN 50385:2002	☐ EN 302 291-2 V1.1.1(2005-07)
☐ EN 62311:2008	

☒**2006/95/EC-LVD Directive**

☒ EN 60950-1 / A12:2011	☐ EN 60065:2002 / A12:2011

☐**2009/125/EC-ErP Directive**

☐ Regulation (EC) No. 1275/2008	☐ Regulation (EC) No. 278/2009
☐ Regulation (EC) No. 642/2009	☐ Regulation (EC) No. 617/2013

☒**2011/65/EU-RoHS Directive** Ver. 140331

☒**CE marking**

CE (EC conformity marking)

Position : **CEO**

Name : **Jerry Shen**

Declaration Date: 20/06/2014

Year to begin affixing CE marking: 2014

Signature : _____